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"In Gray's Manual," Sixth Edition, 1890, the Hepaticae were elaborated by Dr. Underwood and give 144 species. This list needs revision and many additions.

Below we give several good reference books that are generally to be found in University and Botanical libraries:

Stephani, "Species Hepaticarum" which is being published in Bull. de l'Herbier Boissier.

Schiffner, in "Engler and Prantl, Die Natürlichen Pflanzenfamilien," gives the sequence of genera usually followed.

"Synopsis Hepaticarum," by Gottsche, Lindenberg and Nees, 1844.

Karl Müller is publishing a comprehensive work in Rabenhorst's "Kryptogamen-flora von Deutschland, Oesterreich, etc." Vol. 6.

"Monographie der Lebermoosgattung Scapania Dum." by Karl Müller.

"Kryptogamenflora der Mark Brandenburg, Leber und Torfmoose," by C. Warnstorf.

"On Cephalozia" by Richard Spruce.

"Hepaticae of the British Isles," by Pearson.

"Contributions to the Biology of the Hepaticae," by F. Cavers. England, 1904.

"Hepatics of the British Islands," by Canon Henry Wm. Lett.

"A Revised Key to the Hepatics of the British Islands," by Symers M. Macvicar.

"Mosses with a Hand-Lens." Second Edition, Including the Hepatics. A. J. Grout. New York City.

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### ALNUS OREGANA AS CRYPTOGAMIC HOST.

A. S. FOSTER.

When the virgin forest of the Lower Columbia Region is removed, Nature, in her efforts at reforestation, covers the ground the first season with thistles and fireweed, and brambles, ferns and mosses, especially if the area has been burned over, play their part in reclaiming the territory. But in two or three years the western alder, *Alnus Oregana*, has sown its seeds everywhere, and the following year the tract becomes an alder thicket. Indeed it has already occupied the swampy places, as it does not object to "wet feet" and may have been an under-shrub, which is now able to lift its head above its neighbors and ready to encroach upon the hemlocks and spruces. This alder seems hardy, but seldom lives to any great age, because it cannot overtop the lofty spruce.

In its younger stages, the smooth, clean bark of the alder makes an excellent place of lodgement for the spores of lichens. When only five or six years old—a mere pole—it begins to show the markings of the thalloid forms, some of which in their juvenile stages are not unlike the work of a rodent. Almost every part of the trunk becomes encrusted with thalli giving to a young grove a mottled appearance.

Various mosses also, of the same species nearly that Dr. Bailey enumerates as growing on the large-leaved maple (See BRYOLOGIST 6:3, 1903), may

be colonized on the trunk and limbs of the alder. That ubiquitous and "comfortable polypody," *Polypodium occidentale*, is sure to be in evidence if it can find lodgement anywhere. Indeed it appears that *Porella navicularis* offers protection to its creeping stems; sometimes it will intrude upon *Frullania Nisquallensis*, whose reddish woven mats give a pretty relief to the green of the polypody, and this may be set off by some fulvous-green hepatic.

By the time the alder is twenty inches in diameter, and about twenty years old, the entire trunk is preëmpted by some form of moss, hepatic or lichen. The first, no doubt, to claim attention will be *Graphis scripta*, in quaint characters not unlike an Assyrian inscription, riddles for a naturalist to decipher. *Lecanora pallida* and *L. subfusca*, whose apothecia show white and black by contrast, are suggestive of a new pattern of polka-dot. *Lecanora orosthea* is not abundant. *Thelotrema lepadinum* and *Th. leprocarpum* are truly leprous in appearance, and in contrast with them *Placodium cerinum* claims attention. Just out of reach are some bronze spots, *Parmelia olivacea*, and near by, with its coppery-green, finely corrugated thallus, is *Parmelia pertusa*. Some gray bits in low relief are *Parmelia saxatilis* with its characteristic branching. These may be easily removed with a sharp jack-knife, but care must be taken to cut away some of the epidermis and to put them to press immediately. Covering the roots of the tree are *Plagiothecium elegans* and *Hylocomium loreum*.

Let us climb the tree on a wet day, for then must one gather his lichens or spoil many a fine specimen. *Evernia prunastri* gives out a strong scent of iodine, while you observe that the older parts are greenish, due probably to an alga, an alien. Near by is another ramulous plant, grayish, with soredia along the edges of the fronds, *Ramalina farinacea*. Farther inland, about the city of Portland, *Ramalina ciliaris* is found on the maple. That delicate waxy-white thing is *Ramalina Menziesii*. Had Menzies ever seen it he must have admired it. You break off a dead limb; on it is a miniature forest of *Sphaerophorus globiferus*, which behaves somewhat like the Cladonias; it is slow-growing and does not reproduce until several years old. On a larger branch within reach is a modest Quaker in her soft-gray suit of slight pinkish tinge—is it gros grain silk? She belongs to one of the aristocratic families, *Cetraria lacunosa*, so you will carefully remove this rare beauty. *Cetraria ciliaris* is occasionally found on the alder, but it seems to prefer higher timber like the spruce. The same is true of *Parmelia physodes*, and yet the juvenile forms are often seen on the lower parts of our trees.

On the twigs may be found *Physcia stellaris*, an interesting little thing whose apothecia do remind one of the stars. While in pursuit of this, the writer found a form of *Parmelia olivacea* to which Mr. G. K. Merrill has tentatively given the varietal name *imparispora*. *Physcia hispida* is abundant and with *Theloschistes lychnus* prefers trees standing apart, indeed the twigs of an old pear-tree in a yard were so densely covered with these last three forms that there was scarcely room for the buds. These Usneas

are lodged, windcast, on the limbs of the alder; *Usnea barbata hirta* prefers a tree in swampy places, but *U. barbata ceratina* is found on the upland stretches. *Sticta pulmonaria* and *S. Oregana* are often found lodged on the alder, but their juvenile life was spent on the maple. As you climb higher on the tree you may notice the abrasions of *Arthonia asteroides*, which might be mistaken for the natural color of the inner bark. Low down where moss has not obtruded the hand lens reveals several other greenish or yellowish, granular forms, among which are brown grains of dust apparently some of the lower forms of life.

Of course not all of the above lichens were found on any one tree, but at least one half of them were so found, and all were found on the alder within a radius of one-half mile in the vicinity of Cathlamet. Washington.

The coastal region about the estuary of the Columbia River belongs to the humid zone, having an oceanic climate. The southwest winds, carrying heavy loads of moisture from the warmer areas of the Pacific, drop this load as they pass inland and ascend the western slopes of the Cascade Mts., giving a rain fall of 70-90 inches yearly. These warm Chinook winds mitigate the rigors of the winter season and moderate the heat of summer, thus producing in Lat. 46° N. a mild and humid climate with prolonged season of growth very conducive to such plants as ferns, mosses, hepatics and lichens, not to mention the numerous forms of fungi and algae.

Portland, Oregon, June 10, 1907.

NOTE.—The writer is under obligation to Mr. G. K. Merrill, Rockland, Maine, for the determination of the above mentioned lichens, specimens of which are in his herbarium and in that of the Sullivant Moss Chapter, and duplicate specimens in that of the writer.

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## LICHENS OF THE MOUNT MONADNOCK REGION, N. H.

REGINALD HEBER HOWE, JR.

In the American Naturalist for September, 1906 (Vol. XL., No. 447, pp., 661-665), I published a list of seventy-one species of lichens that I had collected on or about Mt. Monadnock. Since then I have had several opportunities to study the lichens of this region, and there has also come into my care as curator of the Thoreau Museum of Natural History at the Middlesex School, Concord, Massachusetts, a large and interesting collection of lichens collected about Keene, N. H., and on Mt. Monadnock. This collection was made by George Alexander Wheelock during the 70's (1877-1880), one volume of specimens is labelled 1877, another 1876-80.

Mr. Wheelock was born in Winchester, N. H., January 21, 1816, and spent almost his entire life in studying the natural history of Keene, N. H. He died June 17, 1906, in Keene. He was what might be called a jack-daw collector of natural history specimens, and his varied collections and scientific books are now installed in this Museum. In Cassino's Naturalist's Directory for 1884, Mr. Wheelock is included among the Cryptogamic Botanists and Entomologists.